Name Key Date

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291 Two Variable Word Problems

1. Grace is shopping at the farmer's market. She is going to buy cucumbers and heads of lettuce. The cucumbers cost \$0.25 each and the heads of lettuce cost \$0.75 each. Her total bill was \$7.50. When she got home, she realized that she bought 12 items. How many of each vegetable did she buy?

c h
(3, 9)

$h + c = 12$

$75h + 25c = 750$ $\quad h = 9$

$-75h - 25c = -300$

$50h = 450$

2. Robby was also at the farmer's market. He wants to buy tomatoes and green peppers. The tomatoes cost \$0.30 each and the green peppers cost \$0.70 each. Robby spent \$7.20 and the number of peppers he bought was 6 fewer than 5 times the number of tomatoes. How many tomatoes did he buy?

t p
3, 9

$30t + 70p = 720$ $\quad 30t + 70(5t - 6) = 720$

$p = 5t - 6$ $\quad 30t + 350t - 420 = +420$

$380t = 1140$

$t = 3$

3. Jack earns \$4.50/h and Liam earns \$5.25/h. Together, they worked a total of 44 h and earned \$205.50. How many hours did each work?

$4.5J + 5.25L = 205.50$ $\quad 4.5(44 - L) + 5.25L = 205.50$

$198 - 4.5L + 5.25L$

$.75L = 7.50$

$L = 10$

$L = 10$

$J = 34$ $\quad J + L = 44$

4. Two isosceles triangles have the same base length. The legs of one of the triangles are twice as long as the legs of the other. Find the lengths of the sides of the triangles if their perimeters are 23 cm and 41 cm.

$2l + b = 23$

$4l + b = 41$

$-2l - b = -23$

$2l = 18$

$l = 9$ cm $\quad b = 5$ cm $\quad$ or 18 cm

5. A store manager has \$520 in one-dollar and five-dollar bills. If there are 5 times as many one-dollar bills as five-dollar bills, how many of each kind are there?

$N + 5F = 520$

$N = 5F$

$10F = 520$

$F = 52$

$N = 260$

6. One hundred and fifteen people attended a drama club production. Students were charged \$1.50, but all others paid \$3.50. In all, \$282.50 was collected. How many students attended?

$S + O = 115$

$1.5S + 3.5O = 282.50$

$1.5s + 3.5(115 - S) =$

$402.5 - 3.5s$

$-2s = -120$

$S = 60$

$O = 55$

7. Kerry asked a bank teller to cash a \$390 check using \$20 bills and \$50 bills. If the teller gave her a total of 15 bills, how many of each type did she have?

$20T + 50F = 390$

$T + F = 15$

$-20T - 20F = -300$

$30F = 90$

$F = 3$

3 Fifty

12 Twenty

8. Tickets for the Ball cost $20 for a single ticket and $35 for a couple. If ticket sales totaled $2280, and 128 people attended. How many tickets of each type were sold?

$20s + 35c = 2280$ $\quad 20s + 35c = 2280$

$s + 2c = 128$ $\quad -20s - 40c = -2560$

$-5c = -280$

$c = 56$, $s = 16$

9. With a given head wind, a plane can fly 3000km in 6 h. Flying in the opposite direction with the same wind blowing, the plane can fly the same distance in 1 h less. Find the plane's air speed and the speed of the wind.

$6(r-w) = 3000$ $\quad r - w = 500$

$5(r+w) = 3000$ $\quad r + w = 600$

$2r = 1100$

$r = 550$ km/h, $w = 50$ km/h

10. With a tail wind, a helicopter traveled 300 mi in 1 hr 40 min. The return trip against the same wind took 20 min longer. Find the wind speed and also the air speed of the helicopter.

T	$r+w$	$1\frac{2}{3}$	$1\frac{2}{3}(r+w) = 300$, $r+w = 180$
H	$r-w$	2	$2(r-w) = 300$, $r-w = 150$

$r + w = 180$

$2r = 330$

$r = 165$ mph, $w = 15$ mph

11. With a head wind, a plane traveled 1000 mi in 4 hr. With the same wind as a tail wind, the return trip took 3 hr 20 min. Find the plane's air speed and the wind speed.

T	$r+w$	$3\frac{1}{3}$	$3\frac{1}{3}(r+w) = 1000$, $r+w = 300$
H	$r-w$	4	$4(r-w) = 1000$, $r-w = 250$

$r - w = 250$

$2r = 550$

$r = 275$ mph, $w = 25$ mph

12. With a tail wind, a plane flew 180 miles in half an hour. With no change in the wind, the return trip took 40 minutes. Find the speed of the wind and the plane's rate in still air.

T	$r+w$	$\frac{1}{2}$	$\frac{1}{2}(r+w) = 180$, $r+w = 360$
H	$r-w$	$\frac{2}{3}$	$\frac{2}{3}(r-w) = 180$, $r-w = 270$

$2r = 630$

$r = 315$ mph, $w = 45$ mph

13. A canoeist paddles 6 miles downstream in 40 minutes and returns in 3hours. How fast does he go in still water?

U	$r-c$	3	$3(r-c) = 6$, $r-c = 2$
D	$r+c$	$\frac{2}{3}$	$\frac{2}{3}(r+c) = 6$, $r+c = 9$

$2r = 11$

$r = 5.5$ mph, $c =$

14. Traveling downstream, a boat can go 12 miles in 2 hours. Going upstream, it makes only two-thirds the distance in twice the time. What is the rate of the boat in still water, and what is the rate of the current?

D	$r+c$	2	12	$2(r+c) = 12$, $r+c = 6$
U	$r-c$	4	8	$4(r-c) = 8$, $r-c = 2$

$2r = 8$

$r = 4$ mph, $c = 2$ mph

15. Marcia flew her ultra-light plane to a nearby town against a head wind of 15km/hr in 2 hours and 20 minutes. The return trip under the same wind conditions took 1 hour and 24 minutes. Find the plane's air speed and the distance to the nearby town.

H	$r - 15$	$2\frac{1}{3}$	$2\frac{1}{3}(r-15) = d = 1\frac{2}{5}(r+15)$
T	$r + 15$	$1\frac{2}{5}$	

$15\left[\frac{7}{3}(r-15) = \frac{7}{5}(r+15)\right]$

$35(r-15) = 21(r+15)$

$35r - 525 = 21r + 315$

$14r = 840$

$r = 60$ km/hr, $d = 105$ km